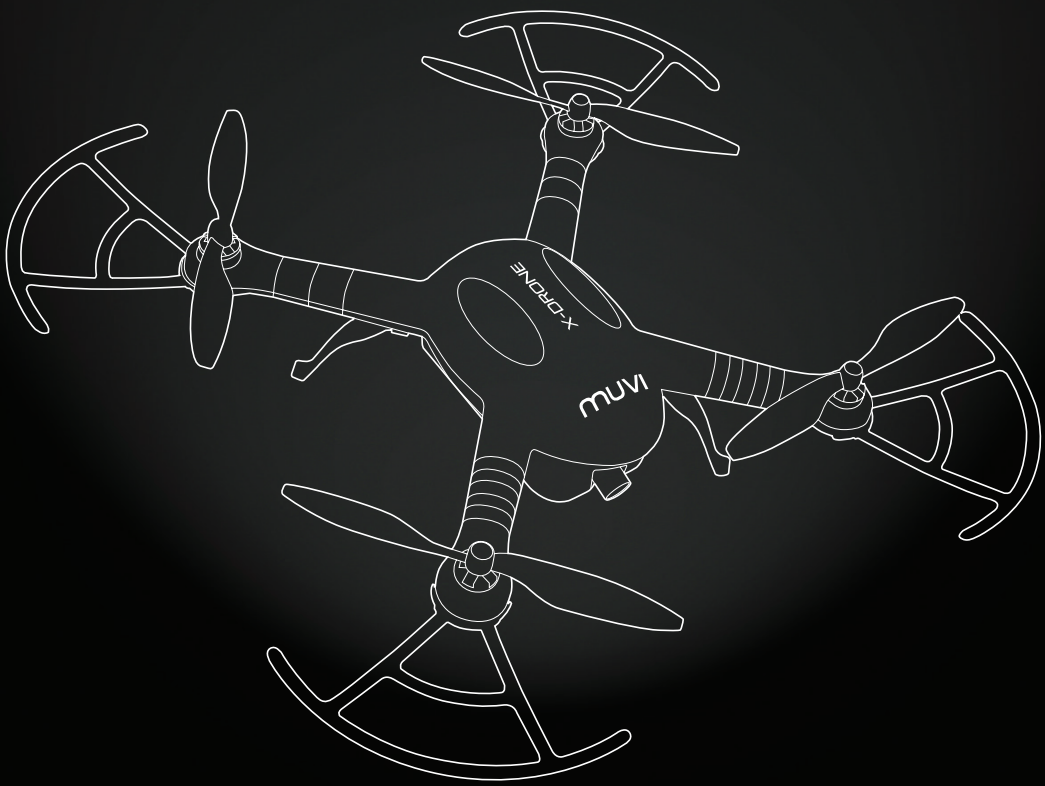
muvi™ X-DRONE

User Manual



VXD-001-B

veho®

X-Drone Manual.indd 1 22/07/2015 14:28

Contents

1. What's in the box? 4

2. Setting up the X-Drone and equipment batteries 6

- 2.1 X-Drone battery specifications
- 2.2 Charging the X-Drone battery
- 2.3 Installing the X-Drone battery
- 2.4 Battery precautions

3. Preparing the X-Drone 7

- 3.1 Flight indicators
- 3.2 microSD card slot
- 3.3 On-board camera

4. X-Drone propellers 12

- 4.1 Installing the propellers
- 4.2 Removing the propellers
- 4.4 Propeller Guards

5. X-Drone controller 14

- 5.1 Switching on the controller
- 5.2 Controller antenna
- 5.3 Controller operating instructions
- 5.4 Pairing the controller and the X-Drone's receiver

6. X-Drone smartphone range extender 19

- 6.1 Guide to the smartphone range extender
- 6.2 WiFi indicator
- 6.3 Power indicator
- 6.4 Pairing
- 6.5 Charging the smartphone range extender

7. Flying the X-Drone 21

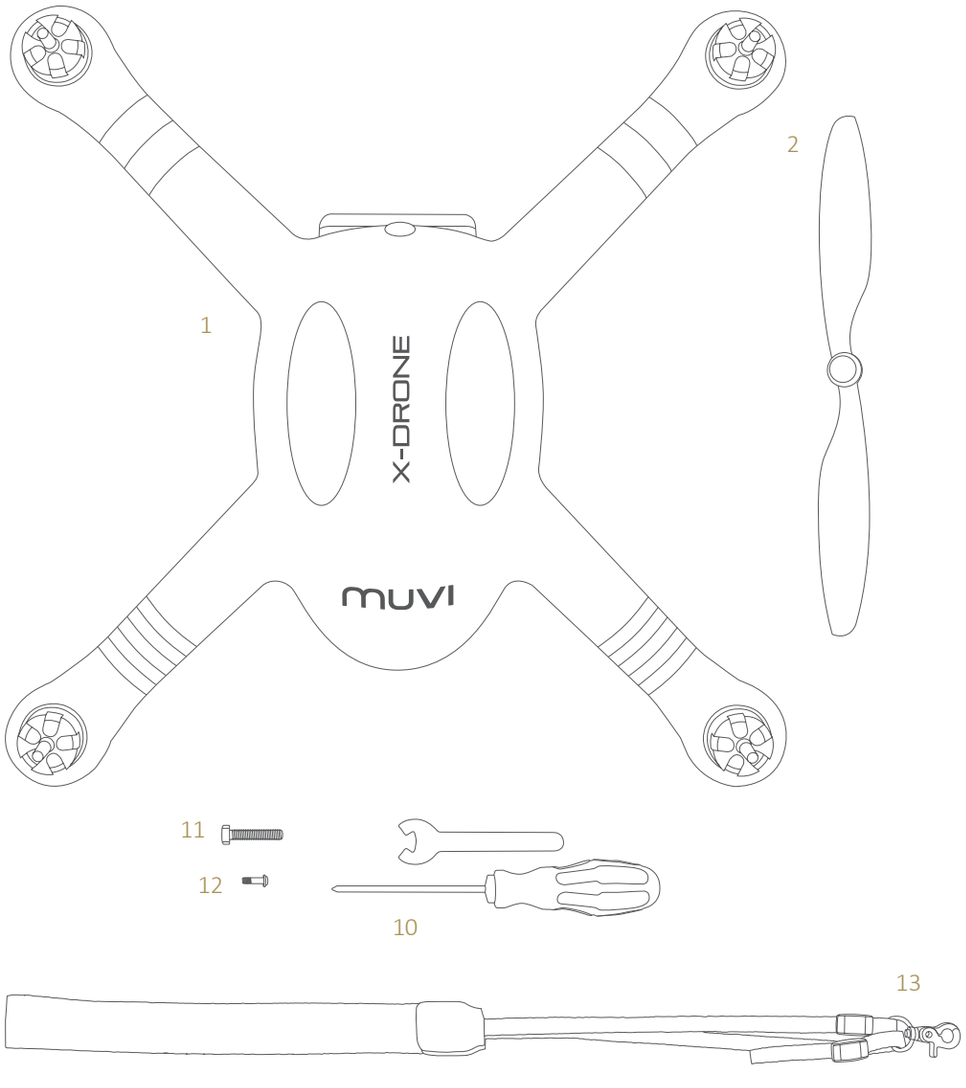
- 7.1 Compass calibration
- 7.2 Starting/stopping the motor
- 7.3 Basic flight
- 7.3 Basic flight
- 7.5 Battery level alarm function

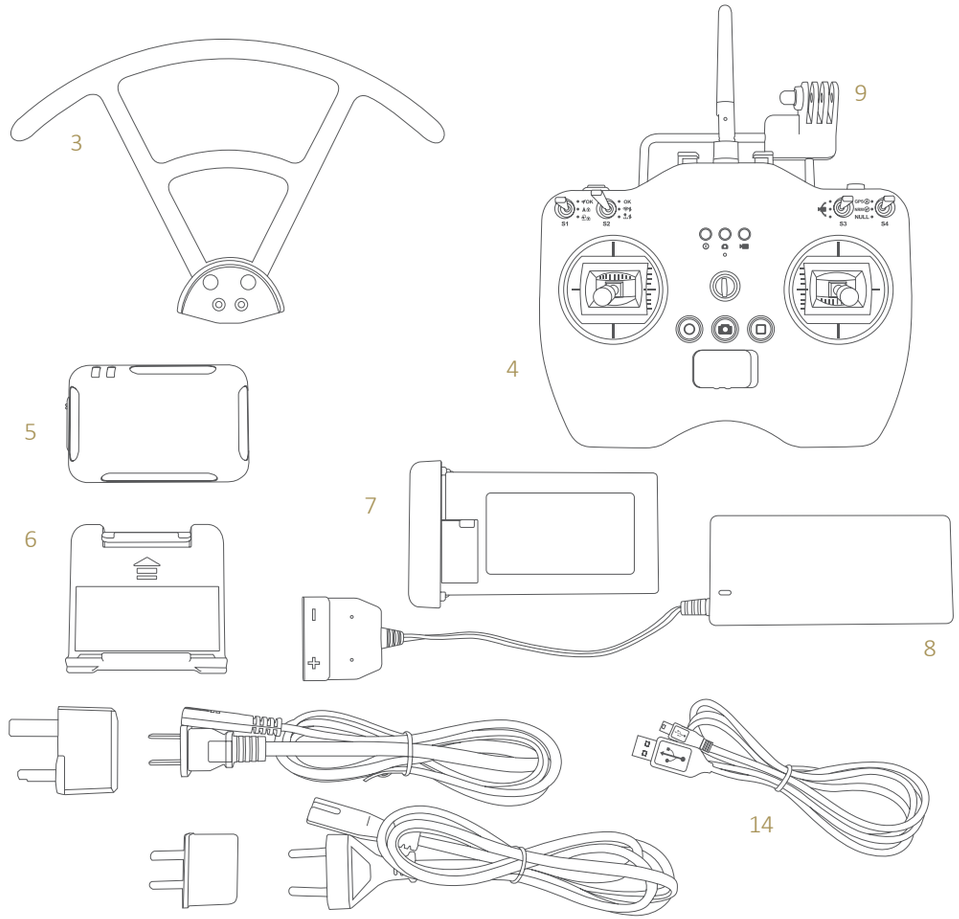
8. Using the X-Drone app 27

- 8.1 Guide to the App
- 8.2 Video recording
- 8.3 Photo capture
- 8.4 Fast shot photo capture
- 8.5 Maximise the preview screen
- 8.6 Settings

9. Specifications 31

1. What's in the box?





1.	X-Drone	x1
2.	Propellers	x4
3.	Propeller Guards	x4
4.	Controller	x1
5.	Smartphone Range Extender	x1
6.	Smartphone Mount	x1
7.	X-Drone Battery	x1
8.	X-Drone Battery Charger	x1
9.	Smartphone Range Extender Adapter	x1
10.	Tool Set (Screwdriver and Wrench)	x1
11.	Screw for Smartphone Range Extender	x1
12.	M3x12 Screws	x8
13.	Controller Strap	x1
14.	USB Cable	x1

X-Drone Manual.indd 5 22/07/2015 14:28

2. Setting up the X-Drone and equipment batteries

Equipment	Power Supply
Controller	4 x AA Batteries
Smartphone Range Extender	The range extender needs to be charged through the built in mini USB charging port
X-Drone	X-Drone Battery (see below)

2.1 X-Drone battery specifications

Capacity	5300mAh
Charging ambient temperature	0°C-50°C/32-122°F
Discharging ambient temperature	-20°C-50°C/-4-122°F
Charge/discharge ambient relative humidity	< 80%

2.2 Charging the X-Drone battery

Connect the X-Drone battery to the X-Drone battery charger and then connect the charger to an AC power source (100-240V, 50/60Hz). Whilst charging the LED on the charger will turn red, when fully charged the LED will turn green. After the battery is fully charged please remove the battery and disconnect the charger.

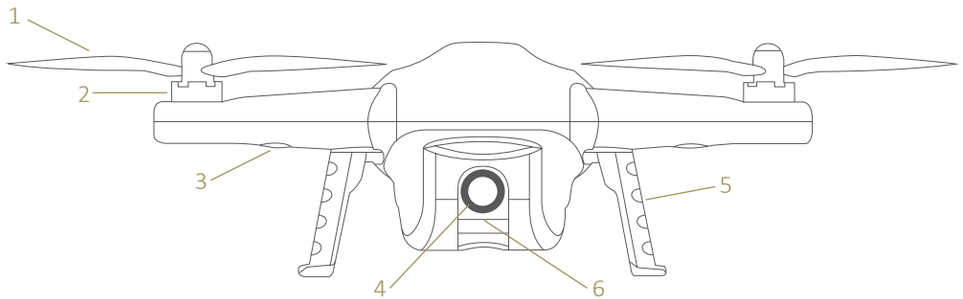
2.3 Installing the X-Drone battery

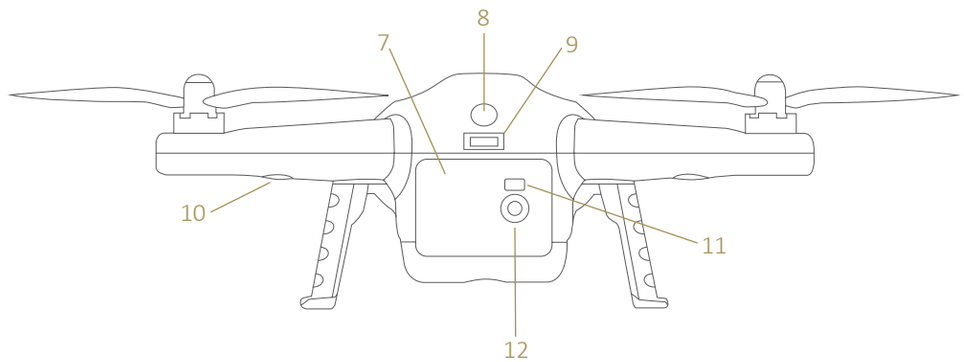
Ensuring that the X-Drone is switched off, insert the battery into the battery compartment on the X-Drone and lock the battery into position. If the battery lock is not fastened the battery may not connect correctly which may affect flight safety or stop the X-Drone from taking off.

2.4 Battery precautions

- Do not pull out the battery whilst the X-Drone is switched on as it may damage the unit.
- If the battery is not going to be used for a long time it is recommended that you discharge the battery to a 40-50% charge level before storing. To maintain battery life discharge and charge the battery every 3 months.
- Do not continue to use or charge the battery if there is any expansion or damage to the battery.

3. Preparing the X-Drone



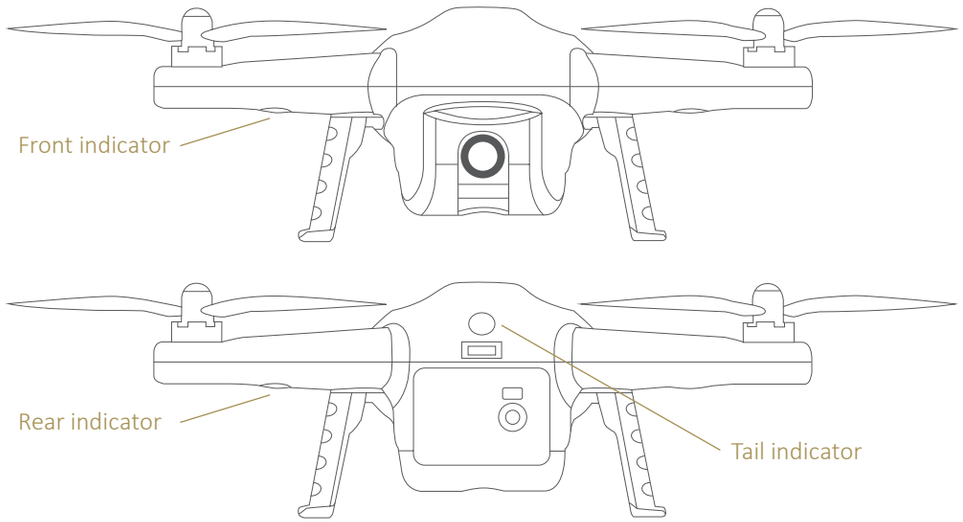


1. Propellers
2. Motor
3. Front Indicator
4. Camera Lens
5. Landing Gear
6. microSD card slot
7. X-Drone Battery
8. Tail Indicator
9. Power Switch
10. Rear Indicator
11. Battery Level Display
12. Battery Level Check Button

X-Drone Manual.indd 6-7 22/07/2015 14:28

3.1 Flight indicators

The X-Drone has three indicators on the front, rear and tail. When the X-Drone is switched on the flight indicators will turn on. The front indicator is green and the rear indicator and tail indicators are red.



Function	Front Indicator	Rear Indicator	Tail Indicator
Low battery alarm – level 1	Slow flash (1s on, 1s off)	Slow flash (1s on, 1s off)	N/A
Low battery alarm – level 2	Fast flash (twice at 1s intervals)	Fast flash (twice at 1s intervals)	
Barometer abnormal state	Solid on	Slow flash (once every 3s)	
GPS abnormal state	Solid on	Fast and slow flash at 3s intervals	
Compass abnormal state	Fast flash	Solid on	
Compass needs calibration	Slow flash	Solid on	
Accelerometer abnormal state	Fast flash	Fast flash	
Accelerometer needs calibration	Switches on, off, then permanently on	Switches on, off, then permanently on	
Gyro abnormal state	Solid on	Fast flash	
Gyro needs calibration	Solid on	Slow flash	
Controller paired to X-Drone			Flash fast
GPS ready			Alternate between flashing fast and solid on

X-Drone Manual.indd 8-9 22/07/2015 14:28

3.2 microSD card slot

Before using the X-Drone please insert the microSD card into the card slot whilst the power is off. The X-Drone can take microSD and microSDHC cards up to a 32GB capacity.

3.3 On-board camera

The on-board camera's power is supplied by the X-Drone battery. The camera will turn on when you turn the X-Drone on. You can take photos and videos through either the controller or through the app.

Camera Specifications

Resolution	1080p at 30fps (NTSC) /1080p at 25fps (PAL)
Image resolution	4608x3456
Video format	MOV (H.264 compression)
Storage	microSD/microSDHC up to 32GB
Photo modes	Single shot and fast shot

Camera function keys on controller

	Start video recording
	Photo capture
	Stop video recording

Status indicators on controller

There are three status indicators on the controller:

Controller power indicator

Red LED – Solid on when the controller is switched on.

Photo capture indicator

Green LED – Flashes once when a photo is captured, otherwise it remains off.

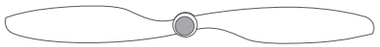
Video recording indicator

Green LED – Turns on, then off when the controller is turned on. Flashes slowly whilst recording video and is solid on whilst pairing.

X-Drone Manual.indd 10-11 22/07/2015 14:28

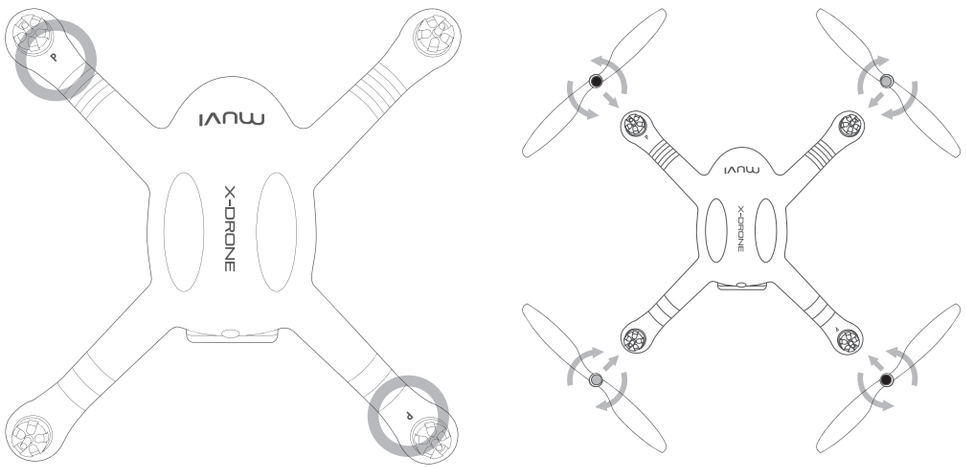
4. X-Drone propellers

The X-Drone uses 10 inch propellers, two with grey rotor blade caps and two with black rotor blade caps.

Propeller	Grey	Black
		
Lock	Turn clockwise to lock	Turn anticlockwise to lock
Unlock	Turn anticlockwise to unlock	Turn clockwise to unlock

4.1 Installing the propellers

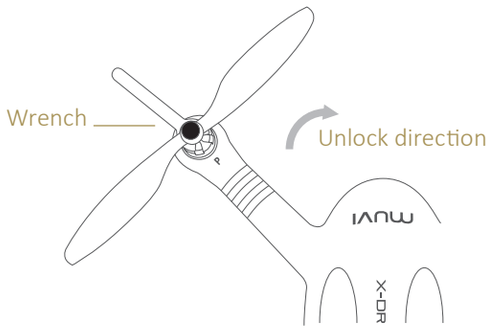
Attach the propellers with the grey caps to the motor shafts without **"P"** marks and attach the propellers with the black caps to the motor shafts with **"P"** marks (circled below). Tighten the propellers as per the lock direction (see above).



PLEASE NOTE: The propellers are designed for automatic turning, therefore do not tighten excessively during installation.

4.2 Removing the propellers

Whilst holding the motor with your hand or the supplied wrench, hold and rotate the propeller in the unlocking direction (see above).

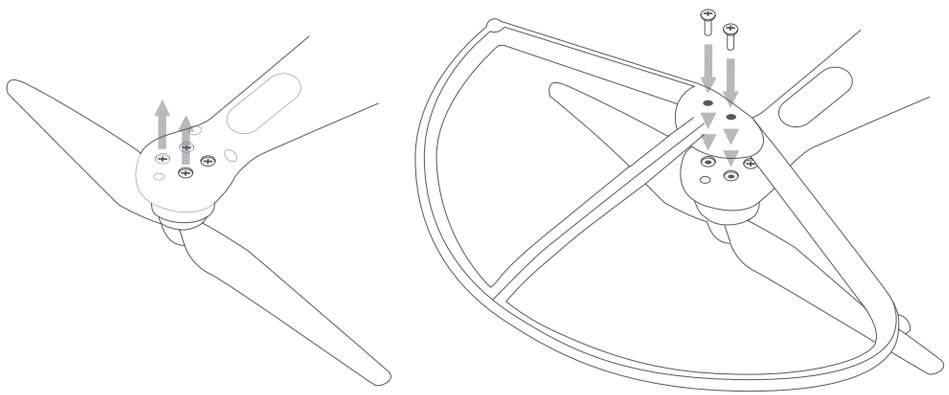


4.3 Precautions

- Before each flight check that the propellers are correctly and firmly installed.
- Ensure all propellers are intact before each flight.
- Keep your distance from rotating propellers and the motors to avoid cuts and injury.
- Only use propellers that have been provided by Veho to ensure optimal performance.

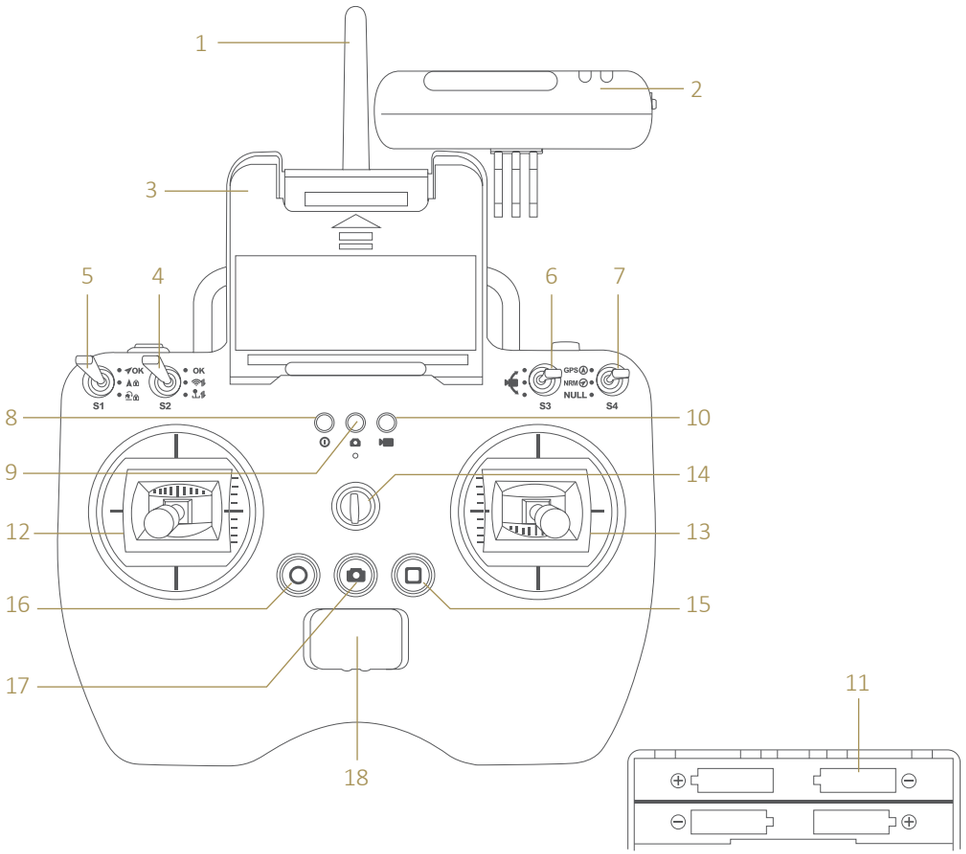
4.4 Propeller Guards

You can protect your X-Drone's propellers from being damaged during flights by installing the propeller guards. To install a propeller guard remove the two M3x8 screws at the end of each motor, then place the propeller guard in position and attach using the M3x12 screws provided. Tighten the screws as required. Please keep the M3x8 screws in a safe place and replace when not using the propeller guards.



X-Drone Manual.indd 12-13 22/07/2015 14:28

5. X-Drone controller



1. Antenna
2. Repeater
3. Smartphone mount
4. S2 3 position switch
5. S1 3 position switch
6. S3 Camera angle control
7. S4 3 position switch
8. Remote control power indicator
9. Photo capture indicator
10. Video recording indicator
11. Battery compartment
12. Left joystick
13. Right joystick
14. Strap hole
15. Stop video button
16. Start video record button
17. Photo capture button
18. Remote control power switch

Joystick and S1-S4 switch functions

Left joystick	Up and Down – Throttle / Left and Right – Yaw
Right joystick	Up and Down – Pitch / Left and Right – Roll
S1	1 OK Normal Flight 2 Not allocated 3 Not allocated
S2	1 OK Joystick Calibration OK 2 X-Drone and WiFi Range Extender Pairing 3 Calibrating Joystick
S3	Related Control to Servo (Tilt up) Stop (Medium) (Tilt Down)
S4	1 GPS GPS Mode 2 NRM Normal Mode 3 NULL Null (Reserved)

5.1 Switching on the controller

- Insert 4 AA batteries (not provided) into the battery compartment as per positive and negative directions
- Ensure that the two joysticks are in the centre position. Push switches S1 and S2 to the top position.
- Push the power switch on the controller to on. The power indicator will turn on and stay solid red.

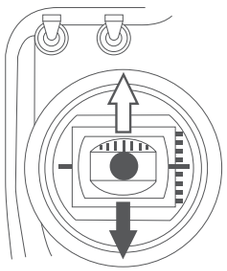
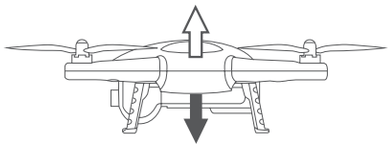
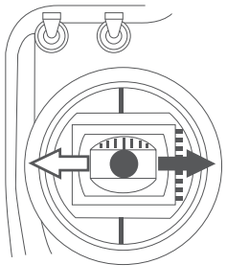
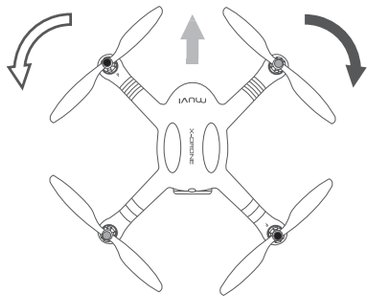
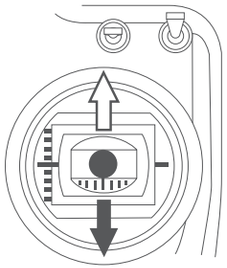
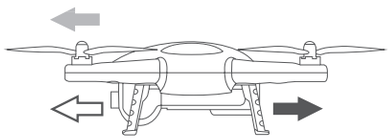
Before each use make sure the controller has sufficient battery. If the batteries are low the controller will make a sound to indicate low power. Please remove the batteries if you do not intend to use the controller for a long time.

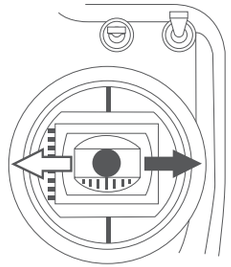
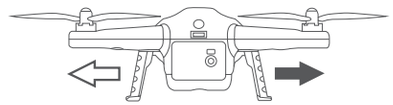
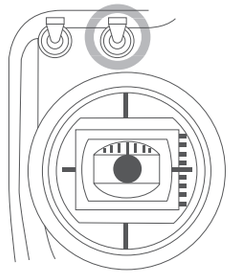
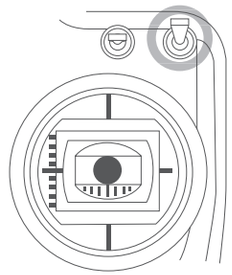
5.2 Controller antenna

To maintain a strong communication between the controller antenna and the X-Drone receiver antenna please keep the controller antenna pointing towards the sky and ensure that there are no obstacles between the controller antenna and the X-Drone receiver. You may lose control of the X-Drone if the antenna is obstructed. Make sure that the smartphone range extender and smartphone (if applicable) do not block the antenna.

X-Drone Manual.indd 15 22/07/2015 14:28

5.3 Controller operating instructions

Controller	X-Drone Direction	Control Method
		The left joystick controls the X-Drone elevation. Push the left joystick upwards over the centre position to make the X-Drone take off from the ground. (Please push the left joystick slowly to prevent the X-Drone from suddenly and unexpectedly rising). Push the joystick up, the X-Drone rises. Pull the joystick down, the X-Drone descends. Keep the joystick at the centre position and the X-Drone will hover at that particular height.
		The left joystick also controls the X-Drone rotation. Push the joystick left and the X-Drone rotates counterclockwise. Push the joystick right and the X-Drone rotates clockwise. If the joystick is centred, the X-Drone will fly in the same direction without rotating. The joystick controls the rotating angular velocity of the X-Drone. Move the joystick to increase X-Drone rotation velocity.
		The right joystick controls the X-Drone's front & back tilt. Push the joystick up and the X-Drone will tilt and fly forward. Pull the joystick down and the X-Drone will tilt and fly backwards. The X-Drone will keep level and straight if the joystick is centred. Move the joystick faster to increase the tilt angle (maximum is 30 degrees) and for faster flight velocity.

Controller	X-Drone Direction	Control Method
		The right joystick also controls the X-Drone left & right tilt. Push the joystick left and the X-Drone will tilt and fly left. Push the joystick right and the X-Drone will tilt and fly right. The X-Drone will keep level and straight if the joystick is centred. Move the joystick faster to increase the tilt angle (maximum is 30 degrees) and faster flight velocity.
		S2is used to calibrate the left and right joysticks. Move S2 to position 3, and turn on the controller. Then move both joysticks clockwise and counterclockwise twice, ensuring each rotation reaches the maximum degrees. Afterwards, release the joysticks and move S2 to position 1. The video recording indicator (green) will light up for 3 seconds to indicate the completion of the calibration.
		S4 switch is the flight mode toggle switch. Position 1 - GPS mode Position 2 - NRM (normal) mode Position 3 - NULL is reserved function

X-Drone Manual.indd 16-17 22/07/2015 14:28

- In GPS mode, when both joysticks are in the neutral (centre) position, the X-Drone will hover at a fixed-point.
- In normal mode, when all joysticks are in the neutral (centre) position, the X-Drone will remain level, but may drift in a horizontal direction.
- When in GPS mode the X-Drone motors cannot be turned on until the GPS is ready.

5.4 Pairing the controller and the X-Drone's receiver

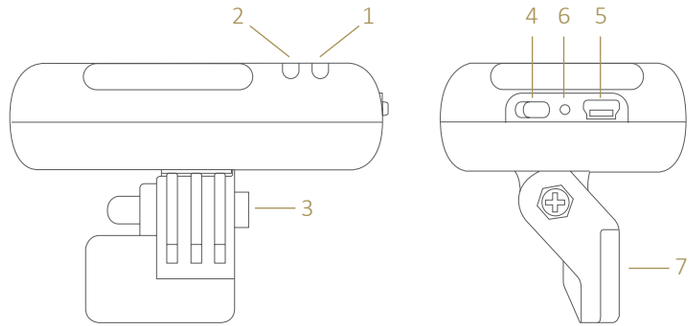
The controller and X-Drone have already been paired together prior to shipping. You only need to follow the instructions below if the controller or receiver have changed.

Make sure that the controller is turned off and then turn on the X-Drone. The front, rear and tail indicators will light up. When you hear a 'beep' sound turn on the controller. The video indicator will light up indicating that pairing has commenced. When the tail indicator continuously flashes fast the link between the controller and the X-Drone receiver has been successfully established.

6. X-Drone smartphone range extender

The X-Drone smartphone range extender is a wireless communication device that works in the 2.4GHz frequency band and is used to increase the effective communication distance between the smartphone and the X-Drone. The communication distance is affected by the surrounding environment, such as blockages due to trees, signal reflection by buildings, interference by other same frequency bands.

6.1 Guide to the smartphone range extender



1. Power indicator
2. WiFi indicator
3. Locking screw
4. Power switch
5. Charging port
6. Pairing button
7. Base

6.2 WiFi indicator

WiFi Indicator (Blue)	Description
Solid on	Range extender startup completed
Flashing fast	Range extender not paired with onboard camera
Flashing slowly	Successfully paired smartphone range extender with onboard camera

6.3 Power indicator

Power Indicator	Description
Red light solid on	Range extender is on
Red light flashes	Range extender is charging or low battery, please charge asap
Red light solid on	Charging is complete

X-Drone Manual.indd 19 22/07/2015 14:28

7. Flying the X-Drone

6.4 Pairing

The onboard camera and smartphone range extender have been paired prior to shipping so it is not necessary to carry out pairing again. If the WiFi indicator flashes quickly or remains solid on please follow the instructions below to repair.

1. Turn on the controller, X-Drone and smartphone range extender respectively.
2. Once the smartphone range extender's WiFi indicated turns solid blue move the S2 switch on the controller to the centre position, then move back to 'OK'.
3. Press and hold the pairing button on the smartphone range extender for 3 seconds. The smartphone range extender will automatically restart for re-pairing and then the WiFi indicator will flash slowly to indicate that the smartphone range extender has been successfully paired with the onboard camera.

6.5 Charging the smartphone range extender

Connect the smartphone range extender adapter to the mini USB port on the smartphone range extender and connect the adapter to charge. It will take approximately 2 hours for the battery to fully charge.

To turn the smartphone range extender on move the power switch to the on position. When the WiFi indicator blinks slowly the smartphone range extender is ready.

Before each flight check that the smartphone range extender has sufficient charge. Turn the smartphone range extender on then press the pairing button once:

Power indicator flashes once	Range extender has over 80% charge remaining
Power indicator flashes twice	Range extender has over 50% charge remaining
Power indicator flashes three times	Range extender is low on charge

Flying environment requirements

- Do not use the X-Drone in inclement weather, such as strong winds, snow, rain and fog.
- Select an open area with no tall buildings in the flying site. The presence of a large number of steel buildings in the area will affect the compass.
- While flying the X-Drone stay away from obstacles, people, power lines, shelters, bodies of water etc.
- Do not fly in a complex electromagnetic environment (such as near mobile phone case stations or towers) to avoid transmitter interference.
- Do not fly in restricted or no-fly zones and abide by relevant laws and regulations.

Pre-flight check

- Ensure controller, X-Drone, smartphone range extender and smartphone are fully charged.
- Ensure propellers are correctly installed.
- Ensure the microSD card is properly inserted before using the camera to capture photos and videos.
- Check if the motors start properly after the X-Drone is switch on.

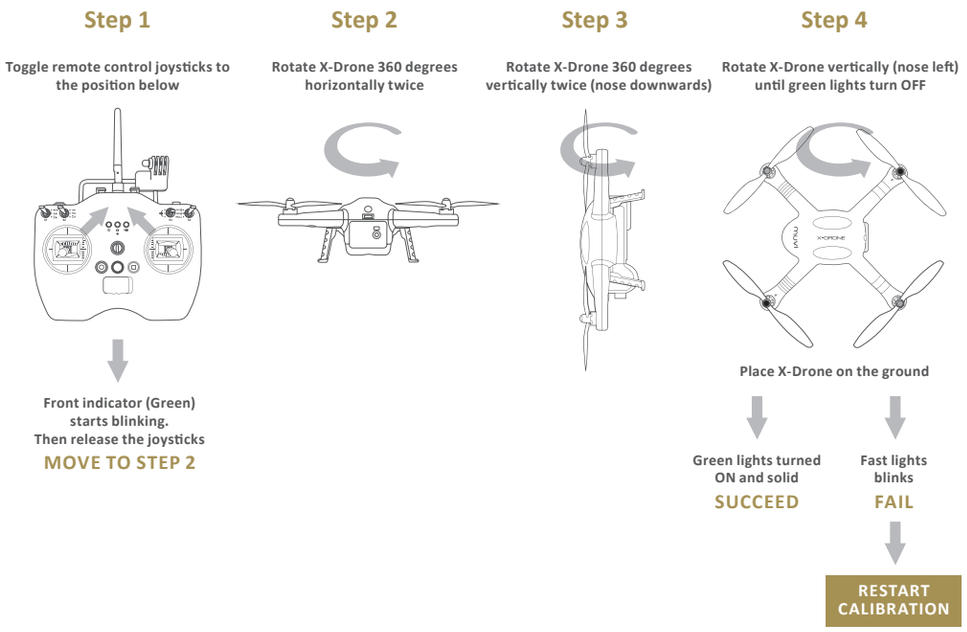
X-Drone Manual.indd 20-21 22/07/2015 14:28

7.1 Compass calibration

IMPORTANT: Make sure to calibrate the compass before use or in every new flight location. The compass is very sensitive to electromagnetic interference, which can cause abnormal compass data leading to poor flight performance or even flight failure. Regular calibration is required for optimum performance.

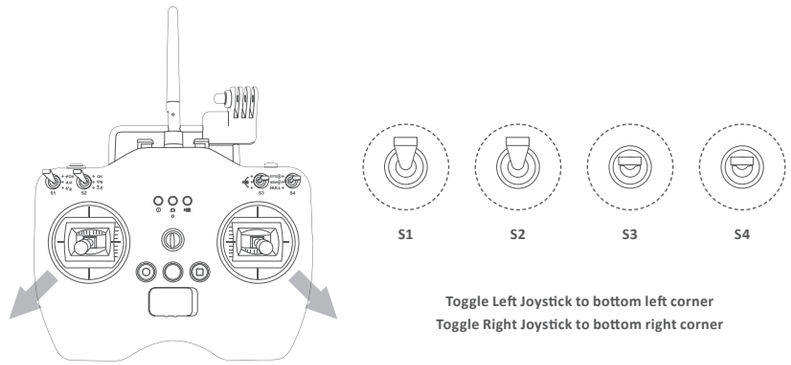
- Do not calibrate the compass in a strong magnetic field.
- Do not carry ferromagnetic material, such as keys, mobile phones, etc. while calibrating the compass.
- The propellers must be removed before calibration to avoid accidental injury.

In a wide, open area turn on the controller and X-Drone and make sure that the equipment is working properly and follow the procedure below to calibrate.


Step 1
Toggle remote control joysticks to the position below
Front indicator (Green) starts blinking. Then release the joysticks
MOVE TO STEP 2
Step 2
Rotate X-Drone 360 degrees horizontally twice
Step 3
Rotate X-Drone 360 degrees vertically twice (nose downwards)
Step 4
Rotate X-Drone vertically (nose left) until green lights turn OFF
Place X-Drone on the ground
Green lights turned ON and solid
SUCCEED
Fast lights blinks
FAIL
RESTART CALIBRATION

7.2 Starting/stopping the motor

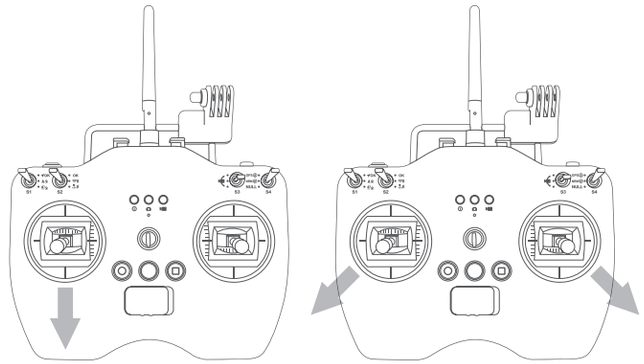
Make sure that the S1-S4 switches are in the positions as shown below. Toggle the left and right joysticks as shown below to start the motor. This is known as Combination Joysticks Command (CJC). After the motors have started release the joysticks immediately.



PLEASE NOTE: When the S4 switch is in GPS mode the motors cannot turn on until the GPS is ready.

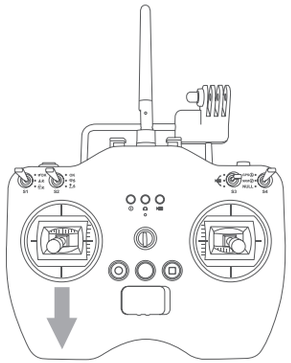
There are two ways to stop the motors on the X-Drone:

1. After the X-Drone lands toggle the throttle (left) joystick, then perform CJC. The motors will immediately stop. Release the joysticks as soon as the motors have stopped.



X-Drone Manual.indd 23 22/07/2015 14:28

2. After the X-Drone lands, toggle the throttle joystick to the lowest position and hold for 3 seconds to stop the motor.



IMPORTANT: Do not stop the motor during flight or else the X-Drone will crash.

7.3 Basic flight

1. Place the X-Drone on flat, open ground and ensure that the tail indicator faces toward you.
2. Turn on the controller, smartphone range extender and X-Drone.
3. Wait until the tail indicator flashes slowly and the X-Drone enters a safe flying state. Perform CJC to start the motor.
4. Push the throttle (left) joystick up slowly to smoothly take off. Please refer to section 5.3 for detailed instructions on controller operating instructions.
5. When landing, slowly pull down the throttle joystick to make the X-Drone descend slowly to the ground.
6. After landing pull the throttle joystick to the lowest position and hold for 3 seconds or until the motors stop.
7. After the motors stop, turn off the X-Drone, smartphone range extender and transmitter, one after the other.

7.4 Failsafe protections

If the X-Drone loses signal from the controller the Automatic Flight Control System will return it to the home point* and land safely. This reduces the chances of the X-Drone getting lost or crashing in case the controller signal is lost.

*The home point is the X-Drone's position where the X-Drone successfully scanned and connected to the satellite. To ensure that the X-Drone successfully flies back to the home point if it enters failsafe mode please only take-off after the X-Drone's GPS has successfully connected to the satellite.

If you lose control of the X-Drone during flight the X-Drone will automatically follow the procedure below:

1. The X-Drone will automatically slow down and hover in one location.
2. If the X-Drone regains signal from the controller within 2 seconds it will return to normal flight mode and will not enter failsafe mode.
3. If the X-Drone does not regain signal from the controller within 2 seconds it will enter failsafe mode and will initiate automatic flight control to return to the home point.

- The X-Drone will continue to hover for 15 seconds and will evaluate the vertical distance to the home point
- If the distance is more than 25 metres the X-Drone will commence flying back to the home point.
- If the distance is less than 25 metres the X-Drone will fly up vertically until it is 25 metres higher than the home point and then commence the return.
- When the X-Drone reaches the home point it will hover for 5 seconds and then automatically land.

PLEASE NOTE: The X-Drone cannot automatically avoid obstacles in its path while it is in failsafe mode.

X-Drone Manual.indd 25 22/07/2015 14:28

8. Using the X-Drone app

How to regain control on the controller

If the X-Drone is out of control toggle the S4 switch on the controller several times to switch flight mode. When the signal is restored, the controller will regain control and you can continue to use the controller to operate the X-Drone.

7.5 Battery level alarm function

When the X-Drone battery charge is low you must land it as soon as possible or else it may lose power completely and crash. The X-Drone has a two level battery alarm function. Level 1 is a low power alarm and level 2 is a severe low power alarm. Both levels are indicates by the flight indicator lights:

Low power alarm level	Flight indicator light status	Low power risk prompt
Level 1	2 front indicators and 2 rear indicates will flash slowly.	In level 1 alarm condition the X-Drone will fly normally for a few minutes and then initiate the level 2 alarm. Be careful while flying, keep the X-Drone within sight and do not fly to high or too far.
Level 2	2 front indicators and 2 rear indicates will flash quickly.	In level 2 alarm condition the X-Drone will fly normally for a few minutes and initiate the failsafe mode and start to automatically land. When in level 2 alarm condition please return and land the X-Drone as safely as possible and do not push the throttle hard or make big movements during flight.

During low power automatic landing you can regain control of the X-Drone by switching the flight mode (S4 switch). However do not do so repeatedly as it may reduce the battery life or the X-Drone may crash due to insufficient power.

The free X-Drone app is available for iOS and Android and allows you to connect your X-Drone to your phone using the in-built WiFi.

Install the app on your phone open the App Store (iOS) or Play Store (Android) on your phone and use the search function to search for Muvi X-Drone. Select the app and then click on the install button to install the app on your phone.

Connecting to the app

Turn on the controller, smartphone range extender and the X-Drone and then turn on the WiFi on your phone and then enter the phone's WiFi settings. Look for X-Drone in the list of available networks and select to connect. You may need to refresh the list or scan for networks for the camcorder to appear. Please enter MUVIXD01 as the password.

Exit the WiFi settings and open the X-Drone app on your phone. To finish connecting tap

in the app.

X-Drone Manual.indd 26-27 22/07/2015 14:28

8.1 Guide to the App

1. Video Resolution
2. Number of files stored on microSD card
3. Remaining recording time available
4. Recording duration
5. Video preview
6. Operation button
7. Video button
8. Settings button
9. Fast shot button
10. Photo button

8.2 Video recording

Make sure that you are in video record mode by pressing the Video button. The Video button will turn blue to indicate that it is in video record mode. Start recording by pressing the operation button. To stop recording press the operation button again.

8.3 Photo capture

Make sure that you are in photo capture mode by pressing the Photo button. The Photo button will turn blue to indicate that it is in photo capture mode. Take a photo by pressing the operation button.

8.4 Fast shot photo capture

Make sure that you are in fast shot capture mode by pressing the Fast Shot button. The Fast Shot button will turn blue to indicate that it is in fast shot capture mode. Take several photos in one second by pressing the operation button.

8.5 Maximise the preview screen

On iOS devices you can maximise the preview screen in Video, Photo and Fast Shot Mode. To maximise the preview screen touch the preview area. You can view the maximised preview screen in both portrait and landscape. To record video or capture a photo or fast shot press the operation button at the bottom of the screen. To exit the maximised preview screen press the back button at the top in the right hand corner.

PLEASE NOTE: On Android devices you can only view the X-Drone app in landscape.

X-Drone Manual.indd 28-29 22/07/2015 14:28

9. Specifications

8.6 Settings

To change settings on the X-Drone press the settings button to enter the settings menu. You can only change the size in record settings when you are in video record mode first.

Record Settings

Size	Set the resolution and frame rate for video capture
View	Set the angle of view between broad, medium, narrow and small
Bit Rate	Set the bit rate between normal and high bit rate

Capture Settings

Size	Choose between capturing 8, 12 or 16 mega pixel images
Fast Shot	Choose between capturing 3 photos in 1 second, 6 photos in 1 second or 10 photos in 1 second

Param Settings

Video Content Loop	Turn on to continually overwrite files when the memory becomes full
TV Output Format	Set the TV output to PAL or NTSC
Date/Time	Set the date and time on the X-Drone to match the date and time on your phone
Format	Select yes to format the microSD card. Note: Formatting will delete all files
Version	Shows the version of firmware that you have
Type	Shows the model number of your X-Drone

X-Drone

Battery	5300 mAh LiPo
Weight	1.4kg/3.09lbs
Hover Accuracy	Horizontal: ±2.5m / 8.2ft , Vertical: ±0.8m/2.62ft
Maximum tilt angle	30°
Maximum climb/descent speed Maximum flight speed	Climb: 6 m/s (19.69ft/s); Descend: 4 m/s (13.12ft/s) 20m/s (65.62ft/s) (Not recommended)
Wheelbase	450mm/1.48ft
Flight time	20-25 minutes

Camera

Ambient operating temperature	0-50°C/32-122°F	
Sensor size	1/2.3	
Photo resolution	16 mega pixels	
Video Resolution	Full HD 1080p	
Frame rate	PAL	NTSC
	1080p at 25fps or 50 fps	1080p at 30fps or 60 fps
	960p at 25fps or 48fps	960p at 30fps or 48fps
	720p at 25fps or 50fps	720p at 30fps or 60fps
	480p at 50fps or 100fps	480p at 60fps or 120fps
Video recording format	MOV (H.264 codec)	
Photo format	JPG	

Controller

Data transfer distance	500m (1640ft)
Battery life	8 hours
Operating current/voltage	150mA/6V
Battery	4 x AA batteries

Smartphone Range Extender

Operating frequency	2.4GHz
Communication distance (open field)	300m/948ft
Transmitting power	<=17dBm
Power consumption	1.5W

X-Drone Manual.indd 30-31 22/07/2015 14:28

veho®

www.veho-world.com